Hall effect detection of optically invisible defects in CVD graphene

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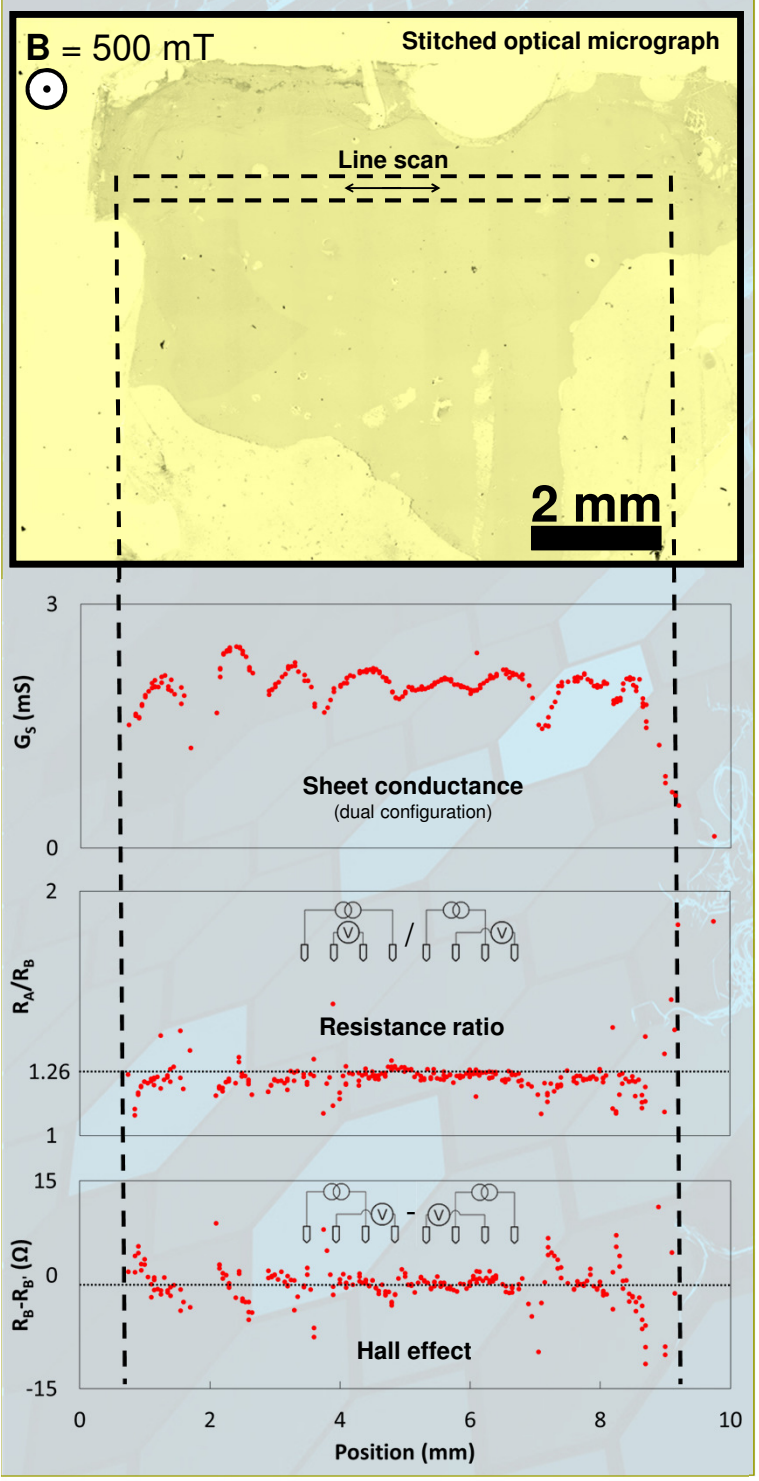
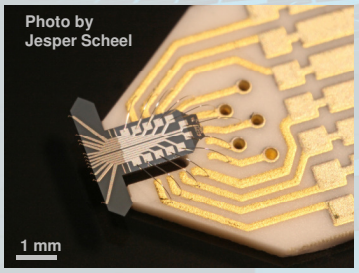
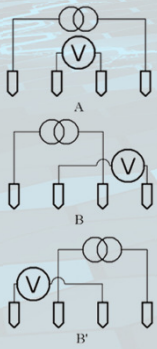
CVD graphene quality



Micro four-point probe





Sheet conductance

$$e^{2\pi R_A G_S} - e^{2\pi R_B G_S} = 1$$

Resistance ratio

$$R_A / R_B$$

Hall effect

$$R_B - R_{B'}$$

Electrical continuity

2D Uniform:

$$\frac{R_A}{R_B} = 1.26$$

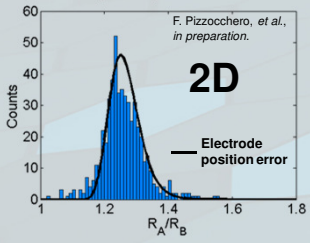
$$R_B - R_{B'} = 0$$

"1D" Nonuniform:

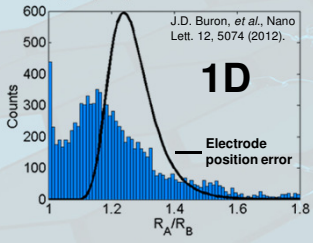
$$\frac{R_A}{R_B} \to 1.0$$

$$R_B - R_{B'} \neq 0$$

CVD graphene grown on single crystalline Cu

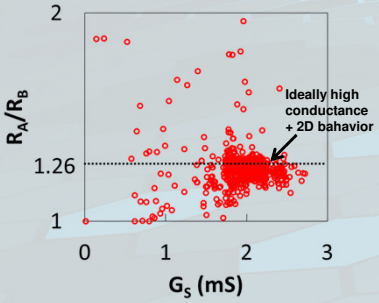


CVD graphene grown on polycrystalline Cu foil

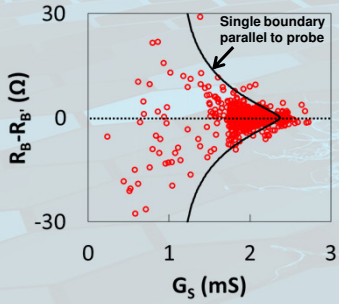


Conductance / defect correlation

Resistance ratio



Hall effect



Sensitivity to electrically insulating line defects